



October 8, 2003

Michael B. Johannesen  
Lowenstein & Sandler, PC  
65 Livingston Ave.  
Roseland, NJ 07068

RE: 14846-37

Dear Mr. Johannesen,

Enclosed please find the results of your patentability search, invoice no. 03-0245 and a CD-ROM containing electronic copies of all references.

As you review the results, please keep in mind this search represents a thorough and continuous effort to locate the most appropriate references given the information provided in your September 23<sup>rd</sup> letter and the budget placed on this project. This is not a guarantee that every potential reference has been located.

Thank you for the opportunity to assist you again and I look forward to working with you in the future.

Best regards,

A handwritten signature in black ink, appearing to read "Norm Gilman", written in a cursive style.

Norm Gilman  
Gilman Research Services, LLC

8

**CLIENT** Michael B. Johannesen  
Lowenstein & Sandler, PC  
65 Livingston Ave.  
Roseland, NJ 07068

**CASE** 14846-37

**REQUEST DATE** September 23, 2003

---

**REQUEST** Patentability Search

**POINTS OF FOCUS** Publications that describe in general, as stated in client's search request of September 23, 2003, the elements further described in the provisional application for patent Tree-Based Database.

**RESULTS** This search resulted in a total of 16 patent references and seven (7) nonpatent references that either speaks directly or indirectly to the points of focus.

## RESOURCES

<b>PATENT LITERATURE</b>	
<i>USPTO</i>	US Full Text, US Published Patent Applications
<i>Class/Subclass</i>	707/103, 201, 3, 101, 8, 102, 4, 100, 104, 6
<i>Lexis-Nexis</i>	US Full Text, US Published Patent Applications
<i>Delphion</i>	US Full Text, US Published Patent Applications, WIPO PCT Applications
<b>NONPATENT LITERATURE</b>	
<i>Lexis-Nexis</i>	General News, Industry News, Encyclopedia of Associations, Company News, GUI Program News, Productivity Software, Technology Decisions, Worldwide Databases, CIO Insight
<i>Dialog</i>	Dissertation Abstracts (35), Conference Paper Index (77), Inside Conferences (65), New Product Announcements (621).
<i>Internet Search Engines</i>	Google, Teoma, All The Web, Open Directory Project, Fast Search, Copernic
<i>e-Resources</i>	IBM Technical Disclosure Bulletin, IP.com, Research Disclosure, HalfBakery.com, Shouldexist.com, Social Science Research Network Electronic Library, SlashDot
<i>Usenet Newsgroups</i>	Google Newsgroups, comp.databases, comp.databases.ms-access, comp.databases.ms-sqlserver, comp.databases.oracle.marketplace
<i>Academia/Trade Groups &amp; Associations</i>	University of Washington Database Research Group, Simon Fraser University Intelligent Database Systems Research Laboratory, MIT Laboratory for Computer Science, DOD Advanced Research Projects Agency, USC Information Sciences Institute

## SEARCH STRATEGY

<b>SEARCH TERMS</b>	Database design	Tree-based	Leaf
	Node	Forest	Represent
	Report	Exchange	Query
	Storage	Update	Communicate
	Interface	Financial risk management	Financial services
	Financial instrument	Table	Domain
	Navigate	Drill	Expand
	Focus	Limit	Xml
<b>SEARCH STRINGS</b>	((database <near> (tree base*)))	((database <near> (tree base*))) and (financial <near> risk)	((database <near> (tree base*))) and (financial <near> risk)) and (xml)
	((tree-based) and (xml)) AND ((707103) <in> NC)		

### **Patent References**

US6014671

Interactive retrieval and caching of multi-dimensional data using view elements  
INVENTOR(S) Castelli; Vittorio, Li; Chung-Sheng, Smith; John Richard  
DATE FILED 1998-05-15  
DATE PUBLISHED 2000-01-11  
ASSIGNEE International Business Machines Corporation

An apparatus and method for representing and retrieving multi-dimensional data such as large satellite images. Images are stored in forms that can be rapidly browsed and retrieved by remote client applications in a drill-down or roll-up fashion. The data can be represented and retrieved using a view element data structure that includes node elements and transition elements between nodes. The data is decomposed (in space or spatial-frequency to construct a tree-based or graph-based data structure) into view elements. A set of view elements is selected, compressed and stored without adversely impacting image view extraction or generation speed. View elements are placed into the node elements of the data structure and the transition elements indicate the processing to generate other view elements in the data structure. In a server-side view construction, the view elements are selectively retrieved from storage, decompressed, and processed to generate the views of the data. In a client-side progressive view construction, the client caches the view elements and processes them in combination with view elements retrieved from the server to generate views of the data. The data reuse at the client reduces data transmission in drill-down or roll-up browsing. Data can be ingested, read and written in units of spatial blocks and decomposed into view elements using the spatial block units. Thus, the ingestion, decomposition, compression, and view retrieval for large images can be done using computer devices that have limited storage and processing capabilities.

---

US6356920

Dynamic, hierarchical data exchange system  
INVENTOR(S) Vandersluis; Kirstan A.  
DATE FILED 1999-03-08  
DATE PUBLISHED 2002-03-12  
ASSIGNEE X-Aware, Inc

A computer system provides the ability to construct and edit a Data Definition File (DDF) containing hierarchically related elements of data, some of which are dynamic in that they must execute in order to produce or retrieve data. A client computer system having knowledge of a DDF appropriate for its uses sends a request to a server, which contains or can retrieve the DDF requested by the client. The request contains parameters used by the server to customize the resulting keyed data file for the client's purposes. Upon receipt of the request, the server copies the DDF into a coupled memory, performs requested parameter substitutions, and executes dynamic elements to produce resulting data elements. The process is repeated recursively for all elements of the hierarchical structure, until no dynamic elements remain, then the

resulting keyed data file is returned to the client for its uses. Data elements may be derived from a plurality of sources, and these sources may be combined and manipulated using a plurality of data operations, including relational algebra or structured query language, enabling joins and merges between multiple sources and formats. An Authoring System is provided which assists in the construction and validation of DDFs.

---

US6411957

System and method of organizing nodes within a tree structure  
INVENTOR(S) Dijkstra; Wilco  
DATE FILED 1999-06-30  
DATE PUBLISHED 2002-06-25  
ASSIGNEE ARM Limited

A system and method are provided for organizing and managing a tree structure having a plurality of nodes representing physical entities, the tree structure defining a number of node locations, each node location being reached via a predetermined path from a root node of the tree structure. The method comprises the steps of associating first and second keys with each node to be included in the tree structure, the value of at least the first key being unique for each node, and then arranging the nodes within the tree structure by sorting the nodes with respect to both the first key and the second key, the sorting with respect to the first key being such that each node may be positioned within the tree structure at any node location along the path from the root node to the node location specified by the first key. By this approach, a search can be performed for a node within the tree structure based on specified criteria for both the first and second keys.

---

US6418446

Method for grouping of dynamic schema data using XML  
INVENTOR(S) Lection; David Bruce, Merrick; Roland Albert  
DATE FILED 1999-03-01  
DATE PUBLISHED 2002-07-09  
ASSIGNEE International Business Machines Corporation

A method, system, and computer-readable code for a technique with which data having dynamically variable record formats (such as that created when a dynamic schema is used with a data repository) can be easily and efficiently accommodated, without requiring modification of the code that processes the data each time the underlying data format changes. This mechanism provides a novel way to gather data that may have had changes to its format, and create a structured representation of this data that flexibly adapts to format variations. This novel technique enables all added data fields in a record to be made available for processing and removed data fields to be omitted, without requiring advance knowledge of the added and removed fields. In the preferred embodiment, a DOM tree created from an XML representation of the source data is used by the present

invention as it creates an output DOM tree. Optionally, the results of an LDAP query from an LDAP directory can be used as the source data.

---

US6532467

Method for selecting node variables in a binary decision tree structure  
INVENTOR(S) Brocklebank; John C., Weir; Bruce S., Czika; Wendy  
DATE FILED 2000-04-10  
DATE PUBLISHED 2003-03-11  
ASSIGNEE SAS Institute Inc.

A method for selecting node variables in a binary decision tree structure is provided. The binary decision tree is formed by mapping node variables to known outcome variables. The method calculates a statistical measure of the significance of each input variable in an input data set and then selects an appropriate node variable on which to base the structure of the binary decision tree using an averaged statistical measure of the input variable and any co-linear input variables of the data set.

---

US6571249

Management of query result complexity in hierarchical query result data structure using balanced space cubes  
INVENTOR(S) Garrecht; Thomas, Loritz; Axel, Weiss; Anton  
DATE FILED 2000-09-27  
DATE PUBLISHED 2003-05-27  
ASSIGNEE Siemens Aktiengesellschaft

A method, system, computer program product, server, and interface for managing query results includes receiving query results and semantic structuring information, and defining a root node corresponding to the query to which the results relate. A semantically structured tree descending from a root node has intermediate nodes in layers according to the semantic structuring information. The leaf nodes each correspond to a query result. The leaf nodes are attached to the tree based on an up-tree relation. The tree has a space cube structure balanced on the basis of a semantic threshold.

---

US6578129

Optimized virtual memory management for dynamic data types  
INVENTOR(S) da Silva Junior; Julio L., Catthoor; Francky, Verkest; Diederik  
DATE FILED 1999-07-23  
DATE PUBLISHED 2003-06-10  
ASSIGNEE IMEC vzw

The present invention proposes effective solutions for the design of Virtual Memory Management for applications with dynamic data types in an embedded (HW or SW) processor context. A structured search space for VMM mechanisms with orthogonal decision trees is presented. Based on said representation a systematic power exploration methodology is proposed that takes into account characteristics of the applications to prune the search space and guide the choices of a VMM for data dominated applications. A parameterizable model, called Flexible Pools, is

proposed. This model limits the exploration of the Virtual Memory organization considerably without limiting the optimization possibilities.

---

US6591260

Method of retrieving schemas for interpreting documents in an electronic commerce system  
INVENTOR(S) Schwarzhoff; Kelly, Venkat; Ramshankar  
DATE FILED 2000-01-28  
DATE PUBLISHED 2003-07-08  
ASSIGNEE Commerce One Operations, Inc.

A method and computer system are described for conducting commercial transactions by the exchange of electronic documents. The computer system includes a transaction services network, which comprises a plurality of transaction servers for providing services to support commercial transactions. Trading partners operate servers which communicate with the transaction services network via the Internet. The electronic documents are exchanged between trading partners engaged in a transaction. The documents are written in a markup language such as XML. The tags used in the document instances are defined in schemas. Each schema defines a document type, which corresponds to a type of transaction. An enhanced type of XML schema may be used which supports integrity constraints and polymorphism. Schemas are identified by the use of Uniform Resource Names. XML processors residing on transaction servers or trading partner servers parse document instances by retrieving the URNs corresponding to the schemas used to interpret the document. The URNs are converted to location-specific URIs in order to locate the schemas. URNs are resolved to location-specific URIs by use of the LDAP protocol. URNs may be converted to LDAP URLs which are used to search LDAP compliant directories. The directories serve as registries for the location-specific URI values corresponding to the URNs.

---

US20020083034A1

Method and apparatus for extracting data objects and locating them in virtual space  
INVENTOR(S) Orbanes, Julian, Guzman, Adriana  
DATE FILED 2001-02-14  
DATE PUBLISHED 2002-06-27  
ASSIGNEE

The invention provides method and apparatus for viewing information. In one embodiment, the system of the invention enables the user to view displayed information in a way that is comparable to a selected physical paradigm. Example physical paradigms include, but are not limited to, financial, educational, governmental, sports, media, retail, travel, geographic, real estate, medical, physiological, mechanical, surveillance, agricultural, industrial, infrastructure, scientific and other like paradigms. By presenting information to the user in a way that more closely mimics physical paradigms, the system provides an intuitive mechanism for the user to view, search through and interact with displayed information in an unrestricted manner. In another embodiment, the appearance is a graphical representation of one or more data objects, related to other data objects through hierarchical relationships defined by one or more

templates. As the user adjusts the viewing perspective, the appearance changes in a seemingly continuous, non-discrete manner.

---

US20020143774A1

Dynamic, hierarchical data exchange system  
INVENTOR(S) Vandersluis, Kirstan Anderson  
DATE FILED 2001-11-13  
DATE PUBLISHED 2002-10-03  
ASSIGNEE

A computer system provides the ability to construct and edit a Data Definition File (DDF) containing hierarchically related elements of data, some of which are dynamic in that they must execute in order to produce or retrieve data. A client computer system having knowledge of a DDF appropriate for its uses sends a request to a server, which contains or can retrieve the DDF requested by the client. The request contains parameters used by the server to customize the resulting keyed data file for the client's purposes. Upon receipt of the request, the server copies the DDF into a coupled memory, performs requested parameter substitutions, and executes dynamic elements to produce resulting data elements. The process is repeated recursively for all elements of the hierarchical structure, until no dynamic elements remain, then the resulting keyed data file is returned to the client for its uses. Data elements may be derived from a plurality of sources, and these sources may be combined and manipulated using a plurality of data operations, including relational algebra or structured query language, enabling joins and merges between multiple sources and formats. An Authoring System is provided which assists in the construction and validation of DDFs.

---

US20030014421A1

METHODS, APPARATUS AND DATA STRUCTURES  
FOR PROVIDING A UNIFORM REPRESENTATION  
OF VARIOUS TYPES OF INFORMATION  
INVENTOR(S) JUNG, EDWARD K.  
DATE FILED 1999-06-03  
DATE PUBLISHED 2003-01-16  
ASSIGNEE

Methods and apparatus for analyzing tasks performed by computer users by (i) gathering usage data, (ii) converting logged usage data into a uniform format, (iii) determining or defining task boundaries, and (iv) determining a task analysis model by "clustering" similar tasks together. The task analysis model may be used to (i) help users complete a task (such help, for example, may be in the form of a gratuitous help function), and/or (ii) to target marketing information to users based on user inputs and the task analysis model. The present invention also provides a uniform semantic network for representing different types of objects in a uniform way.

---

US20030050931A1

System, method and computer program product for page rendering utilizing transcoding  
INVENTOR(S) Harman, Gregory, Zondervan, Quinton Y.  
DATE FILED 2001-08-28

DATE PUBLISHED 2003-03-13  
ASSIGNEE

A system, method and computer program product are provided for rendering arbitrary content for display on a particular viewing device. First, content is received. The content is assembled into an object-oriented structure in a centralized format. The content in the centralized format is translated to a markup language compatible with a display environment of a viewing device using a descriptor that defines parameters of the display environment. The markup language is formatted for display on the viewing device. The formatted markup language is output to the viewing device. A system, method and computer program product are also provided for rendering arbitrary content for display on a particular viewing device: Content is received and assembled into a Document Object Model (DOM) tree in a centralized format. The content in the DOM tree is translated to a markup language compatible with a display environment of a viewing device. The markup language is formatted for display on the viewing device. Such formatting includes splitting the markup language into multiple pages for display on the viewing device. The formatted markup language is output to the viewing device. A system, method and computer program product are also provided for dividing content into multiple pages for display on a particular viewing device. Content is received and translated to a markup language compatible with a display environment of a viewing device. The markup language is split into multiple items. The multiple items are parsed into multiple pages. One page of the set of pages is output to the viewing device. The one page has a pointer to at least one of the other pages.

---

US20030088593A1

Method and apparatus for generating a directory structure  
INVENTOR(S) Stickler, Patrick  
DATE FILED 2002-03-20  
DATE PUBLISHED 2003-05-08  
ASSIGNEE

A directory structure utilizing metadata extracted from data entities. A directory path is created by associating path fragments retrieved from each entity. The entities have their interrelationships explicitly defined through their positions in a scoped hierarchy that is independent of any underlying file structure of the storage device on which they may be held.

---

US20030126151A1

Methods, apparatus and data structures for providing a uniform representation of various types of information  
INVENTOR(S) Jung, Edward K.  
DATE FILED 2003-02-13  
DATE PUBLISHED 2003-07-03  
ASSIGNEE

Methods and apparatus for analyzing tasks performed by computer users by (i) gathering usage data, (ii) converting logged usage data into a uniform format, (iii) determining or defining task boundaries, and (iv) determining a task analysis model by "clustering" similar tasks together. The task analysis model may be used to (i) help users complete a task (such help, for example, may be in the form of a gratuitous help

function), and/or (ii) to target marketing information to users based on user inputs and the task analysis model. The present invention also provides a uniform semantic network for representing different types of objects in a uniform way.

---

US20030131007A1

Object type relationship graphical user interface  
INVENTOR(S) Schimmer, Andrew L, Goodwin, James  
DATE FILED 2000-02-25  
DATE PUBLISHED 2003-07-10  
ASSIGNEE

A computer- and software-based apparatus and method is disclosed for managing and presenting information as a domain of data objects which can be grouped according to their category or "object type," and which can be associated with other data objects, of same or differing object types, according to a myriad of relationship types. The system and method present the network of objects using a computer-generated graphical user interface (GUI) which may comprise a series of tables or trees or other means for representing a set. The invention provides for display of a primary object set comprising a plurality of primary data objects sharing a common object type. On the same or a related GUI display, a plurality of other object sets, known as "secondary object sets," are displayed in order to present data objects related to the data objects of the primary object set. When a data object in the primary set is selected (by cursor or similar means), each of the secondary object sets will display data object related to the selected data item in the primary set. This "relationship traversal" allows the user to explore the network and ascertain relationships between data objects. The system and method also provide various additional functions to explore and analyze the data, including sorting, attribute filtering, context filtering and view pivoting. Relationship traversal and the additional functions allow the user to view structure and detail at the same time, and to engage in "data mining" to appreciate previously unappreciated relationships between discrete data objects.

---

US20030167266A1

Creation of structured data from plain text  
INVENTOR(S) Saldanha, Alexander, McGeer, Patrick C., Carloni, Luca  
DATE FILED 2001-01-08  
DATE PUBLISHED 2003-09-04  
ASSIGNEE

A method and system for converting plain text into structured data. Parse trees for the plain text are generated based on the grammar of a natural language, the parse trees are mapped on to instance trees generated based on an application-specific model. The best map is chosen, and the instance tree is passing to an application for execution. The method and system can be used both for populating a database and/or for retrieving data from a database based on a query.

---

### **Nonpatent References**

#### **Genetic Algorithms for Optimal Logical Database Design**

The focus of this paper is database design using automated database design tools or more general CASE tools. We present a genetic algorithm for the optimization of (internal) database structures, using a multi-criterion objective function. This function expresses conflicting objectives, reflecting the well-known time/space trade-off. This paper shows how the solution space of the algorithm can be set up in the form of tree structures (forests), and how these are encoded by a simple integer assignment. Genetic operators (database transformations) defined in terms of this encoding behave as if they manipulate tree structures. Some basic experimental results produced by a research prototype are presented.

---

#### **ERDraw: An XML-based ER-diagram Drawing and Translation**

The Entity-Relationship (ER) model is one of the most popular methodologies for designing relational databases. Several commercial ER-diagrams in a graphical fashion. Their architectures and implementation details, however, are not available in public. Inspired by these products and recent developments in XML technology and semantic drawing framework Drawlet, we have developed an educational prototype ERDraw that supports drawing Erdiagrams visually and translating them to relational database schemas automatically. In this paper, we describe the architecture of ERDraw and its implementation details to illustrate how such a tool can be developed.

---

#### **A Self-Stabilizing Distributed Branch-and-Bound Algorithm**

The Branch-and-Bound algorithm is fundamental for a variety of Applications in Combinatorial Optimization. Known distributed algorithms for this problem do not tolerate faults. This paper presents the first distributed self-stabilizing branch-and-Bound algorithm. This algorithm is inherently tolerant to transient faults and can recover from transmission errors between nodes.

---

#### **A Model for Worldwide Tracking of Distributed Objects**

We describe a service for locating distributed objects identified by location-independent object identifiers. An object in our model is physically distributed, with multiple active copies on different machines. Processes must bind to an object in order to invoke its methods. Part of the binding protocol is concerned with contacting the object, which offers one or more contact points. An object can change its contact points in the course of time, thus exhibiting migration behavior. We present a solution to finding an object's contact points which is based on a worldwide distributed search tree that adapts dynamically to individual migration patterns.

---

#### **GiST: A Generalized Search Tree for Database Systems**

---

#### **Tree-Structured Indexes**

---

#### **Improving Index Performance through Prefetching**

---